Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 through 35 - Cancelled.

New claims:

36. (New) A grating, suitable for filtering optical radiation, comprising a plurality of concatenated grating sections, physical characteristics of each section differing from physical characteristics of each adjacent section so that the propagation constants of adjacent grating sections differ, wherein at least some of the sections each comprise a waveguide structure formed by a thin strip (100) of material having a relatively high free charge carrier density surrounded by material having a relatively low free charge carrier density, the strip having finite width (W) and thickness (t) with dimensions such that optical radiation having a wavelength in a predetermined range couples to the strip and propagates along the length of the strip as a plasmon-polariton wave.

37. (New) A grating according to claim 36, wherein said grating sections are arranged in cells each comprising a pair of adjacent grating sections, the cells being identical.

38. (New) A grating according to claim 36, wherein grating sections are arranged in cells each comprising a pair of adjacent grating sections, the grating being non-uniform.

39. (New) A grating according to claim 38, wherein the cells of the grating vary along its length in a chirped manner.

40. (New) A grating according to claim 39, wherein the chirping is linear.

41. (New) A grating according to claim 39, wherein the chirping is non-linear.

42. (New) A grating according to claim 36, wherein the grating comprises at least two interleaved sets of cells, each cell comprising a pair of adjacent grating sections.

43. (New) A grating according to claim 36, wherein the grating comprises a plurality of segments, each segment comprising a set of cells that are similar in size and shape, but the cells of each segment differing in shape and/or size from the cells of other segments, each cell comprising a pair of adjacent grating sections.

44. (New) A grating according to claim 36, wherein the grating comprises a series of cells, each cell comprising a pair of adjacent grating sections, said series comprising a first set of cells (Λ_1, Λ_2, ... Λ_S) and a second set of cells (Λ_1', Λ_2', ... Λ_S'), the two sets of cells being different from each other and interleaved alternately cell by cell.

45. (New) A grating according to claim 44, wherein the first set is equivalent to the second set transposed longitudinally.

46. (New) A grating according to any one of claims 36, 38, 42, 43 and 44, wherein said physical characteristics of at least some of the grating sections vary along the length of the grating such that an effective refractive index profile of the grating is apodized.

47. (New) A grating according to claim 46, wherein the apodization is sinusoidal.

48. (New) A grating according to any one of claims 36, 37, 38, 42, 43 and 44, wherein each of said grating sections comprises a said waveguide structure.

49. (New) A grating according to claim 46, wherein each of said grating sections comprises a said waveguide structure.

50. (New) A grating according to claim 47, wherein each of said grating sections comprises a said waveguide structure.

51. (New) A grating according to claim 36, wherein respective strips of different said waveguide structures are made of different material.

52. (New) A grating according to claim 36, wherein respective strips of different said waveguide structures have different widths.

53. (New) A grating according to claim 36 wherein respective strips of different said waveguide structures have different thicknesses.

54. (New) A grating according to claim 36, wherein said strips are other than rectangular in shape in plan.

55. (New) A grating according to claim 36, wherein said grating sections are arranged in cells each comprising a pair of grating sections, each pair of adjacent grating sections in a said cell comprising two trapezoidal strips with their broader edges juxtaposed.

56. (New) A grating according to any one of claims 36, 37, 38, 42, 43, 44, 51, 52, 53 and 54, wherein each strip has a substantially square cross-sectional shape.

57. (New) A grating according to claim 46, wherein each strip has a substantially square cross-sectional shape.

58. (New) A grating according to any one of claims 36, 37, 38, 42, 43, 44, 51, 52, 53 and 54, wherein said grating sections each comprise a waveguide structure and the respective plurality of strips are integral with each other.

59. (New) A grating according to claim 56, wherein said grating sections each comprise a waveguide structure and the respective plurality of strips are integral with each other.

60. (New) A grating according to any one of claims 36, 37, 38, 42, 43, 44, 51, 52, 53 and 54, further comprising adjusting means for modifying an optical response of the grating.

61. (New) A grating according to claim 56, further comprising adjusting means for modifying an optical response of the grating.

62. (New) A grating according to claim 58, further comprising adjusting means for modifying an optical response of the grating, the adjusting means comprising at least one electrode positioned near the grating structure and connected to one terminal of a voltage source, a second terminal of the voltage source being connected to at least one said strip.

63. (New) A grating according to claim 62, wherein the material between the grating structure and the electrode is an electro-optic material and the voltage source provides a potential gradient therein.

64. (New) A grating according to any one of claims 36, 37, 38, 42, 43, 44, 51, 52, 53 and 54, wherein the plurality of concatenated grating sections comprise a series of said waveguide structures and a corresponding series of spaces alternating with said waveguide structures.

65. (New) A grating according to claim 64, further comprising adjusting means for modifying an optical response of the grating, the adjusting means comprising a voltage source for providing a potential difference between the strips of alternate ones of the series of waveguide structures and the strips of intervening ones of the waveguide structures.

66. (New) A grating according to claim 65, wherein the material between the sections is an electro-optic material and the voltage source provides a potential gradient therein.

67. (New) A grating according to claim 66, wherein the spaces are filled with a material that is the same as said surrounding material.

68. (New) A grating according to claim 36, comprising at least a second said plurality of concatenated grating sections disposed alongside and substantially parallel to the first-mentioned plurality of concatenated grating sections to form a two-dimensional array of grating sections, the size and shape of the strips in the grating sections being determined such that stop bands in the optical spectrum appear at desired spectral locations.

69. (New) A grating according to claim 68, comprising at least a second said two-dimensional array of grating sections, the arrays being disposed in respective different planes that extend adjacent and substantially parallel to each other.

70. (New) A method of producing a grating suitable for filtering optical radiation within a specified range of wavelengths and formed from waveguide strips surrounded by a dielectric material, the method comprising the steps of:

(i) using a numerical analysis method, deriving for said wavelength, a strip of a particular material, and a particular surrounding dielectric material, normalized phase constant (β/β_0) and

normalized attenuation constant (α/β_0) for a particular strip thickness and each of several strip widths, or for a particular strip width and for each of a plurality of strip thicknesses;

(ii) determining a particular structure for the grating as comprising a series of strips, the series having a predetermined overall length, adjacent strips in the series having different widths, or a series of strips all having the same width and with spaces between adjacent ones of the strips, or a series of strips having spaces between adjacent strips, alternate strips having different widths, and selecting a particular length for each of said strips and, where applicable, each of said spaces;

(iii) using the normalized phase constants and normalized attenuation constants derived in step (I), obtaining the complex effective refractive index ($\tilde{n}_{eff} = \beta/\beta_0 - j\alpha/\beta_0$) of the main mode supported by each of said strips in said series;

(iv) constructing an equivalent stack of dielectric slices, each slice taking on the complex effective refractive index of the corresponding strip in said series of strips, or, where the slice corresponds to a space, the refractive index of the medium in said space;

(v) deriving the optical response of the equivalent stack;

(vi) if the derived optical response is not the desired optical response, repeating steps (ii), (iii), (iv) and (v) with different parameters for the grating; and

(vii) if the derived optical response is the desired optical response, fabricating the grating with said particular structure.

71. (New) A method according to claim 70, wherein the optical response is derived using a transfer matrix method or coupled mode theory.

72. (New) A method according to claim 70, for producing a uniform grating, wherein the optical response is derived using the Bloch theorem.

73. (New) A method according to claim 70, 71 or 72, wherein the numerical analysis method is selected from the Method of Lines, the Finite Element Method and the Finite Difference Method.